UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND
1 CONGRESS STREET
SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO THE WATERS OF THE UNITED STATES.

NPDES NO: **MA 0101257**

DATES OF PUBLIC NOTICE: June 21, 2007 – July 20, 2007

NAME AND ADDRESS OF APPLICANT:

Board of Selectmen
6 Prospect Street
Orange, Massachusetts 01364

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Town of Orange Wastewater Treatment Facility
295 West Main Street
Orange, Massachusetts 01364

RECEIVING WATER: **Millers River (Segment MA35-04)**

CLASSIFICATION: **B (Warm Water Fishery)**

LATITUDE: 42° **35' 39" N** LONGITUDE: **72° 19' 20" W**

I. Proposed Action, Type of Facility, and Discharge Location

The above named applicant has requested that the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection (MassDEP) reissue its NPDES permit to discharge into the designated receiving water, the Millers River. The Town of Orange Wastewater Treatment Facility (WWTF) is a 1.1 million gallon per day (MGD) secondary treatment plant serving a population of approximately 3,700. There are no industrial dischargers to the Orange WWTF. The plant consists of a bar rack, grit collectors, fine bubble aeration tanks, secondary clarifiers and chlorine contact tanks. Disinfection is seasonal and accomplished with the use of sodium hypochlorite.

The sewerage system consists of approximately 20 miles of separate sewers and is subject to

significant infiltration and inflow (I/I) due to its age. The Town completed a Comprehensive Wastewater Management Plan in 2000 which identified major sources of excessive I/I. The town has since completed a number of I/I reduction projects affecting only about 25% of the collection system. With 75% of the collection system unaddressed, excessive I/I remains a problem.

Sludge is thickened, stored in sludge holding tanks, and hauled to the East Fitchburg WWTF for incineration. The location of the facility is shown in Figure 1.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on recent monitoring data is shown in Attachment 1.

III. Permit Limitations and Conditions

The effluent limitations of the draft permit and the monitoring requirements may be found in the draft NPDES permit.

IV. Permit Basis and Explanation of Effluent Limitation Derivation

The Clean Water Act (CWA or the Act) prohibits the discharge of pollutants to waters of the United States without an NPDES permit unless such a discharge is otherwise authorized by the Act. An NPDES permit is used to implement technology-based and water quality-based effluent limitations as well as other requirements including monitoring and reporting. This draft NPDES permit was developed in accordance with statutory and regulatory authorities established pursuant to the Act. The regulations governing the NPDES program are found in 40 CFR Parts 122, 124 and 125 and Part 133 for secondary treatment.

EPA is required to consider technology and water quality requirements when developing permit effluent limits. Technology based treatment requirements represent the minimum level of control
that must be imposed under Sections 402 and 301(b) of the Act (see 40 CFR 125 Subpart A) to meet Best Practicable Control Technology Currently Available (BPT), Best Conventional Control Technology (BCT) for conventional pollutants, and Best Available Technology Economically Available (BAT) for toxic pollutants.

Under Section 301(b)(1)(C) of the CWA, discharges are subject to effluent limitations based on water quality standards. The Massachusetts Surface Water Quality Standards, 314 CMR 4.00, include requirements for the regulation and control of toxic constituents and also require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established. The State will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained.

The permit must also limit any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is, or may be, discharged at a level that caused, or has reasonable potential to cause, or contribute to an excursion above any water quality criterion [40 CFR §122.44(d)(1)]. An excursion occurs if the projected or actual instream concentrations exceed the applicable criterion. In determining reasonable potential, EPA considers existing controls on point and non-point sources of pollution, variability of the pollutant in the effluent, sensitivity of the species to toxicity and, where appropriate, the dilution of the effluent in the receiving water.

Also note that according to Section 402 (o) of the Clean Water Act and EPA regulation 40 CFR § 122.44(l), when a permit is reissued, effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards or conditions in the previous permit, except under certain limited circumstances. In addition, in accordance with regulations found at 40 CFR Section 131.12, MassDEP has developed and adopted a statewide antidegradation policy to maintain and protect existing in-stream water quality. The Massachusetts Antidegradation Provisions are found at Title 314 CMR 4.04. No lowering of water quality is allowed, except in accordance with the antidegradation provisions.

The limits in the draft permit are based on information in the application, the existing permit, discharge monitoring reports, and toxicity test results.

Waterbody Classification and Usage

The Millers River is classified as a Class B, warm water fishery waterbody. The Massachusetts Surface Water Quality Standards (314 CMR 4.05(3)(b)) state that Class B waters shall have the following designated uses:

> *"These waters are designated as habitat for fish, other aquatic life and wildlife, and for primary and secondary contact recreation. Where designated they shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value."*

This 18.5 mile segment of the Millers River receiving the Orange WWTF discharge extends from the USGS Station No. 01164000 in South Royalston to the Erving Center WWTP discharge. The "*Millers River Watershed 2000 Water Quality Assessment Report"* concludes that the aquatic life designated use is impaired in the upper 6.6 miles and "Alert Status" for the lower 11.9 miles due to PCB contamination from contaminated sediment and release from waste sites and dumps. The PCB contamination and mercury are responsible for the "impaired" status for fish consumption in this segment. The aesthetics use is supported and the other designated uses, primary and secondary contact, were not assessed. The *Proposed Massachusetts Year 2006 Integrated List of Waters* 303 (d) list identifies non-attainment due to priority organics, metals, nutrients, and pathogens.

Flow and Dilution Factor

The existing permitted flow limit for the facility is 1.1 mgd (1.70 cfs) is expressed as a rolling annual average. The draft permit now also requires the Town to report the actual average monthly flows so that the extraneous high flows due to I/I and the progress in reducing these flows can be better determined. The draft permit also includes a requirement that the permittee submit a report in how it plans to continually meet its permit limits in light of the actual high flows.

A dilution factor based upon the design flow of the facility and the 7Q10 flow of the receiving stream is calculated and used to develop certain permit limits. The estimated 7Q10 flow of 40.84 cfs and the dilution factor of 25 used in the current permit are from the 2000 Water Quality Assessment Report. Although fluctuations may occur in the river flow due to a hydro-power facility in Athol and/or flood control from the Tully Reservoir, it is believed that these fluctuations would not affect the low flow conditions and the resulting dilution factor and limits. An updated assessment of the Millers River will more accurately evaluate the impact of those occurrences on river flow at low flow conditions.

A review indicated that the estimated 7Q10 flow and the dilution factor used in the current permit limit calculations are still valid and will be used in the calculations for this permit. The dilution factor calculation is as follows:

7Q10@ WWTF discharge = 40.84 cfs
Design flow = 1.1 mgd = 1.70 cfs

Dilution factor = (River 7Q10 @ Discharge + Design Flow) ÷ Design Flow
Dilution Factor = (40.84 + 1.10) ÷ 1.70 = 25

BOD, TSS and Settleable Solids

The secondary treatment requirements for Publicly Owned Treatment Works (40 CFR Part 133) established a monthly average concentration limit of 30 mg/l and a weekly average concentration limit of 45 mg/l for BOD and TSS. The calculations for the monthly and weekly average BOD and TSS mass limits are:

mass limits	Flow x Concentration x Conversion Factor = lbs/day
30-day average	1.1 mgd x 30 mg/l x 8.34(lb)(l)/(mg)(gal) = 275 lbs/day
7-day average	1.1 mgd x 45 mg/l x 8.34(lb)(l)/(mg)(gal) = 413 lbs/day

These are the same as in the existing permit and are maintained in the draft permit.

The eighty-five percent (85%) removal requirement for BOD and TSS is from the secondary treatment requirements of 40 CFR Part 133.

Settleable solids is no longer a state certification requirement and has been removed from the permit.

Fecal coliform, E. coli and pH

The limitations for fecal coliform and pH are based upon water quality considerations and the Massachusetts state certification requirements under Section (401) (a) (1) of the Clean Water Act, as defined in 40 CFR§124.53 and water quality standards. The disinfection season is at the discretion of the State and recognizes that secondary contact recreation, such as boating and fishing, is likely to occur from the early spring through the autumn months.

On December 29, 2006 the State approved Water Quality Standards which include a revision to the bacteria criteria. Several scientific studies have demonstrated that E. coli is a better indicator than coliform of potential human health effects of bacteria from certain recreational uses, such as swimming. This revision is currently under review by EPA and it has not yet been formally approved. Consequently, the draft permit contains a monthly reporting requirement for E. coli during the disinfection season in addition to the fecal coliform limit.

The current permit has a pH limit of 6.0 – 8.3 because the fine bubble aeration system can oxidize the ammonia-nitrogen thereby reducing the oxygen demand exerted in the river, but also consume alkalinity resulting in reduced effluent pH. EPA and the MassDEP believe the available dilution in the receiving stream provides sufficient buffering for instream pH to maintain compliance with water quality criteria. It is preferable to avoid adding chemicals to raise the pH if there are no associated risks of water quality problems. Consequently, these pH limits are maintained in the draft permit.

Total Residual Chlorine

Total Residual Chlorine (TRC) water quality criteria are established in the *Quality Criteria for Water 1986* (the Gold Book) and the subsequent 2002 update and have been adopted into the State Water Quality Standards. The instream criteria shall not exceed 11 ug/l for chronic toxicity and 19 ug/l for acute toxicity to protect aquatic life. Allowing for available dilution at the annual monthly average flow, the TRC permit limit calculations based on the dilution factor of 25 are shown below.

Average Monthly Chlorine Limit = 11 ug/l * 25 = 275 ug/l = 0.27 mg/l
Daily Maximum Chlorine Limit = 19 ug/l * 25 = 475 ug/l = 0.47 mg/l

These limits are the same as those in the existing permit and are maintained in this draft permit.

Phosphorus

Phosphorus is a nutrient that can promote excessive plant growth which interferes with water uses and reduces instream dissolved oxygen. State water quality standards (314 CMR 4.04(5) Control of Eutrophication) require any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients. As discussed above, this segment of the Millers River appears on the Massachusetts 303(d) list for nutrients.

EPA has published national guidance documents which contain recommended total phosphorus criteria and other indicators of eutrophication. EPA's *Quality Criteria for Water 1986* (the Gold Book) recommends, in order to control eutrophication, that in-stream phosphorus concentrations should be less than 100 ug/l (0.100 mg/l) in streams or other flowing waters not discharging directly to lakes or impoundments. Using the dilution factor of 25 calculated above and the Gold Book criteria, the monthly average phosphorus limit would be:

$$25 * 100 \text{ ug/l} = 2500 \text{ ug/l} = 2.5 \text{ mg/l}$$

More recently, EPA released Ecoregional Nutrient Criteria, established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published ecoregion-specific criteria represent conditions in waters minimally impacted by human activities, and thus representative of water without cultural eutrophication. The Town of Orange Wastewater Treatment Facility is within Ecoregion XIV, Eastern Coastal Plain, Northeastern Coastal Zone. Recommended criteria for this ecoregion is found in *Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV*, published in December, 2001, and includes a total phosphorus criteria of 23.75 ug/l (0.024 mg/l). Using the dilution factor and this ecoregion criteria, the monthly average phosphorus limit would be:

$$25 * 0.024 \text{ mg/l} = 0.600 = 0.6 \text{ mg/l}$$

The current permit monthly average limit is 1.0 mg/l of total phosphorus. While not quite as stringent as a limit based on the ecoregion criteria, it is much more stringent than a limit of 2.5 mg/l based upon the Gold Book criteria. Consequently, the draft permit maintains the average monthly permit limit of 1 mg/l and a reporting requirement for a maximum daily concentration as in the current permit and is consistent with a phased approach to phosphorus limits. If additional data or the completion of a Total Maximum Daily Loading (TMDL) indicates the need for more stringent limits, EPA and MassDEP may exercise the reopener clause of Part II A. 4 of this permit and modify the phosphorus numerical limits.

Nitrogen

The Long Island Sound Comprehensive Conservation and Management Plan (CCMP) identifies excessive discharges of nitrogen from sewage treatment plants as the primary cause of low dissolved oxygen levels in the Sound. This condition is the most serious water quality impairment in the Sound and reduces the viable habitat to support fish. Because the Millers River is tributary to the Connecticut River and eventually empties into Long Island Sound, the EPA has required nitrogen monitoring for facilities discharging to the Connecticut River and its tributaries in Massachusetts. The development of nitrogen loadings of all tributaries to the

Sound will be part of the Agency's approach to establish a nitrogen control strategy. Therefore, the current nitrogen monitoring is maintained in this draft permit.

Metals

The *EPA Quality Criteria for Water, 1986 (Gold Book)* set forth the water quality criteria for metals. In the *National Recommended Water Quality Criteria: 2002* EPA updated its national recommended water quality criteria for pollutants. 314 CMR 4.05(5)(e) Toxic Pollutants of the State water Quality standards specifies *"The Department shall use the water quality criteria for the protection of aquatic life expressed in terms of the dissolved fraction of metals."*

The current permit has a copper reporting requirement. Using copper as an example calculation, a hardness of 11mg/l for the receiving water, used in the previous permit and in line with recent analyses of WET test diluent waters, and a conversion factor (CF) to convert recoverable to dissolved copper, the chronic and acute criteria calculations for the State water quality standards are as follows.

Chronic instream criteria	$e^{\{(0.8545*\ln 11) + (-1.702)\}} * 0.96$ (CF) = 1.36 ug/l
Acute instream criteria	$e^{\{(0.9422*\ln 11) + (-1.700)\}} * 0.96$ (CF) = 1.68 ug/l

EPA regulation 40 CFR §122.45(c) *Metals* requires that all permit effluent limitations for a metal be expressed in terms of "total recoverable metal". Thus, the copper limits are derived by multiplying the criteria by the dilution factor and dividing by a conversion factor. The calculations are shown below.

Chronic copper limit	1.36 ug/l * 25 ÷ 0.96(CF) = 35 ug/l
Acute copper limit	1.68 ug/l * 25 ÷ 0.96(CF) = 44 ug/l

The discharge copper values shown in Attachment 1 and similar values reported in the permit application and WET test results indicate that there appears to be no reasonable potential to exceed the water quality standard for copper. Consequently, the routine copper reporting requirement is removed from the draft permit. The permittee will continue to analyze quarterly effluent samples taken for WET testing for copper.

Likewise, limit calculations and reported chemical analysis results for the other metals indicated that there is no reasonable potential to exceed the water quality criteria. Consequently, the draft permit does not include any limits for those metals.

Whole Effluent Toxicity

The Massachusetts Surface Water Quality Standards require that EPA criteria established pursuant to Section 304(a)(1) of the Clean Water Act be used as guidance in the interpretation of the following narrative criteria:

> *"All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife."*

EPA Region I has developed a toxicity control policy which requires wastewater treatment

facilities to perform the toxicity testing in order to meet the state certification requirement.

National studies conducted by the Environmental Protection Agency have demonstrated that domestic sources contribute toxic constituents to WWTPs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The impact of the toxicity of several constituents in a single effluent is accomplished through whole effluent toxicity (WET) testing.

Based on the potential for toxicity and in accordance with EPA regulation and policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50 Fed. Reg. 30,784 (July 24, 1985); see also, EPA's Technical Support Document for Water Quality-Based Toxics Control).

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

The frequency and type of WET tests depend on the dilution factor and risk factor. Pursuant to EPA Region 1 policy, and MassDEP's Implementation Policy for the Control of Toxic Pollutants in Surface Waters, discharges having a dilution ratio greater than 20:1 and less than 100:1 require acute toxicity testing four times per year with a $LC_{50} \geq 100\%$. As in the current permit only the daphnia, *Ceriodaphnia dubia,* will be tested.

V. Sludge

Section 405(d) of the CWA requires that sludge conditions be included in all POTW permits. However, the permittee's practice of contracting out the sludge disposal is not regulated by the National Sewage Sludge Program. If the permittee changes to a method of sludge disposal that is regulated, then the permittee must comply with the requirements of 40 CFR Part 503.

VI. Endangered Species Act (ESA)

Under Section 7 of the Endangered Species Act, federal agencies are required to ensure that any action they conduct, authorize, or fund is not likely to jeopardize the continued existence of a federally listed species, or result in the adverse modification of critical habitat. EPA has initiated informal consultation with both NOAA Fisheries and the United State Fish and Wildlife Service (USFWS) concerning listed species under their purviews. Listed species in this general area include shortnose sturgeon (*Acipenser brevirostrom*) for NOAA Fisheries, and the bald eagle (*Haliaeetus leucocephalus*) and Northeastern bulrush (*Scirpus ancistrochaetus)* for USFWS.

EPA believes the authorized discharge from this facility is not likely to adversely affect any

federally-listed species, or their habitats for the following reasons:

- The permit will prohibit violations of the state water quality standards.
- Acute toxicity tests will be conducted on *Ceriodaphnia dubia* and current results of the toxicity tests are in compliance with the permit limits;
- This is a re-issuance of an existing permit

EPA is seeking concurrence with this opinion from NOAA Fisheries and USFWS through the informal ESA consultation process

VII. State Certification Requirements

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection (MassDEP) certifies that the effluent limitations included in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The MassDEP has reviewed the draft permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State pursuant to 40 CFR §124.53 and expects the draft permit will be certified.

VIII. Comment Period and Procedures the Final Decision

All persons, including applicants, who believe any condition of the permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to the EPA and MassDEP contacts listed below. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues to be raised in the hearing. A public hearing may be held after at least thirty (30) days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after the public hearing, if held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and to each person who has submitted written comments or requested notice.

IX. EPA and MassDEP Contacts

Additional information concerning the draft permit may be obtained between the hours of 9 am and 5 pm, Monday through Friday from:

Mark Malone (CMP)
Municipal Permits Branch
U.S. EPA
One Congress Street - Suite 1100
Boston, MA 02114-2023
TEL. (617) 918-1619
FAX: (617) 918-2064

email: malone.mark@epa.gov

Paul Hogan
Department of Environmental Protection
Division of Watershed Management
627 Main Street
Worcester, MA 01608
TEL: (508) 767-2796
FAX: (508) 791-4131

paul.hogan@state.ma.us

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Stephen S. Perkins, Director
Office of Ecosystem Protection
U.S. EPA